Scottish Flood Forecasting Service marks 10th Anniversary

Description

The Scottish Flood Forecasting Service (SFFS) is today (Tuesday 9 March) marking a decade of supporting Scotland's preparedness and response to flooding.

Staffed around the clock 365 days a year, the service has been combining hydrological and meteorological data to provide strengthened flood forecasting for Scotland over the last 10 years, and is a close partnership between The Scottish Environment Protection Agency (SEPA) and the Met Office .

Its team of experts across Scotland has delivered more than 3800 national flood guidance statements. These five day forecasts are issued daily to a range of 230 organisations including emergency services and local authorities, helping emergency responders prepare in advance for the impacts of flooding.

Climate change is likely to bring increased risk of coastal, river and surface water flooding. With sea level rise and more extreme weather, including wetter winters, more intense rainfall and thundery weather in summer, the increasing importance of the service to help Scotland prepare and adapt is clear.

The service has played a critical role in forecasting impacts from some of the most significant weather events of the decade, including storms Desmond and Frank in 2015. These saw SEPA issue its first severe Flood Warning since the formation of the SFFS, and its highest number of Flood Warnings in one day (101 warnings) respectively.

Terry A'Hearn, SEPA CEO, said: "Over the last ten years, the SFFS has proved a vital service to help Scotland prepare in advance for the worst impacts of flooding. Preparation is crucial, as we saw in the last fortnight when towns from Aberdeenshire to the Scottish Borders flooded.

"The threat from flooding is real and growing. As well as posing a risk to properties, infrastructure and our environment, it can pose a serious threat to life. We and our partners at the Met Office, together with flood management authorities, community responders and communities themselves all have key roles to play as Scotland learns to live safely with flooding."

Over the last 10 years, the Met Office has made continual improvements to the radar network and other weather technology. This enables the SFFS to issue more detailed daily flood guidance, with ever increasing lead-time and confidence.

Met Office Chief Executive Professor Penny Endersby said: "Climate change is not only resulting in a warming climate but also more intense rainfall which has a crucial bearing on the SFFS's operations. The risk and impacts of flooding are likely to increase over the coming years, meaning we will need to continue to adapt our services.

"Forecasting skills are constantly evolving and developing thanks to world leading, cutting-edge

ork

The service was also recognised by the Royal Meteorological Society for its pioneering work to provide the UK's first operational 24-hour surface water flood risk forecast during the 2014 Commonwealth Games in Glasgow. Showing street-level surface water predictions for the first time, the project was the result of joint research with Scotland's Centre of Expertise for Waters, CREW, and has helped improve understand of flooding that doesn't arise from rivers or the sea.

The launch of the SFFS in March 2011 was supported by the Scottish Government.

Kenny Wratten, Chair of the Local Authorities Resilience Group Scotland, said: "Getting that five day forecast of flooding every morning from SFFS helps councils plan and deliver flood mitigation and response. The earlier we get an indication of what's expected and where, the better we and other responders can gear up to make best use of available resource in areas we know are most likely to be affected.

"For councils this might include extra maintenance in trouble spots, considering road closures, the deployment of flood protection measures, and making arrangements to assist people. More than anything it's about working together using best knowledge to support our communities."

Paul Laidlaw, Resilience Manager for the Scottish Flood Forum said: "Services from the SFFS are invaluable to the Scottish Flood Forum (SFF), as they help us to work with communities to build actions that help them prepare for flooding. The Flood Guidance Statement in particular helps us and other recognised community responders get enough of a heads-up to prepare where flood recovery

resources may need to be deployed, to help those impacted.

“It also provides an excellent learning tool for us to help communities develop flood plans and response exercises, which alongside SEPA Flood Warning messages helps them better avoid, reduce or prevent damages that all too often can leave physical and psychological scars.”

In addition to the five-day flood forecast shared with emergency responders and those with flood-risk management duties, plans are also in progress for a public-facing three-day flood forecasting product, being developed in consultation with the public.

SEPA is Scotland’s national flood forecasting, flood warning and strategic flood risk management authority. As well as working in partnership with the Met Office to forecast for flooding, it operates Floodline in Scotland to warn the public and emergency responders when flooding is likely.

It issues regional Flood Alerts – early advice that flooding is possible – across wide geographical areas covering the length and breadth of Scotland. It also issues local Flood Warnings in areas where it has developed river system monitoring and flood risk impact knowledge. These warnings are issued at shorter notice when it is more certain that a specific area will be affected.

Vincent Fitzsimons, SEPA’s head of flooding, added: “There are some simple steps you can take to help prepare for flooding, including signing up to Floodline, preparing a flood plan, familiarising yourself with how to shut off energy and water supplies, having key contact numbers to hand and considering the use of flood protection products. And when flooding does strike, remember these five important tips;

1. Do not walk, drive or swim through flood water.
2. Do avoid any form of direct contact with flood water as it could be contaminated.
3. Do not use any electrical appliances.
4. Do move to higher ground and wait for the emergency services to find you.
5. Do co-operate with emergency services and your local authority who are responsible for co-ordinating relief measures.”

Further advice can be found at floodlinescotland.org.uk.

Date Created
March 2021

Did the weather fuel climate-changing forest fires in the Amazon in 2019?

Description

In 2019 there was a sudden spike in Amazon fires that captured the world's media attention. Between them the blazes destroyed 906,000 hectares of rainforest – an area larger than the island of Corsica.

In their natural state the forests of the Amazon draw down atmospheric carbon, but during fires this carbon is released to the atmosphere. Pic: Shutterstock.

The thousands of fires produced around 400 million tonnes of carbon emissions adding to the atmospheric concentration of greenhouse gases and exposing millions of people to increased air pollution, including the residents of São Paulo, 1,700 miles away.

With an increase of carbon emissions up by 80 per cent on the previous year, a team of scientists led by the UK Centre for Ecology & Hydrology and the Met Office began a research study to discover if meteorological conditions could account for the fire surge during the year.

The team examined data on land use, population density, rainfall patterns, humidity, temperature and

lightning to build a picture of the likelihood that factors related to weather conditions may have fuelled the increase. The team's results indicated that 2019 was not an unusual year meteorologically and this led to the startling finding that there was only a seven per cent chance that weather conditions triggered the increase in fires in the main deforested areas of the Amazon between June and August.

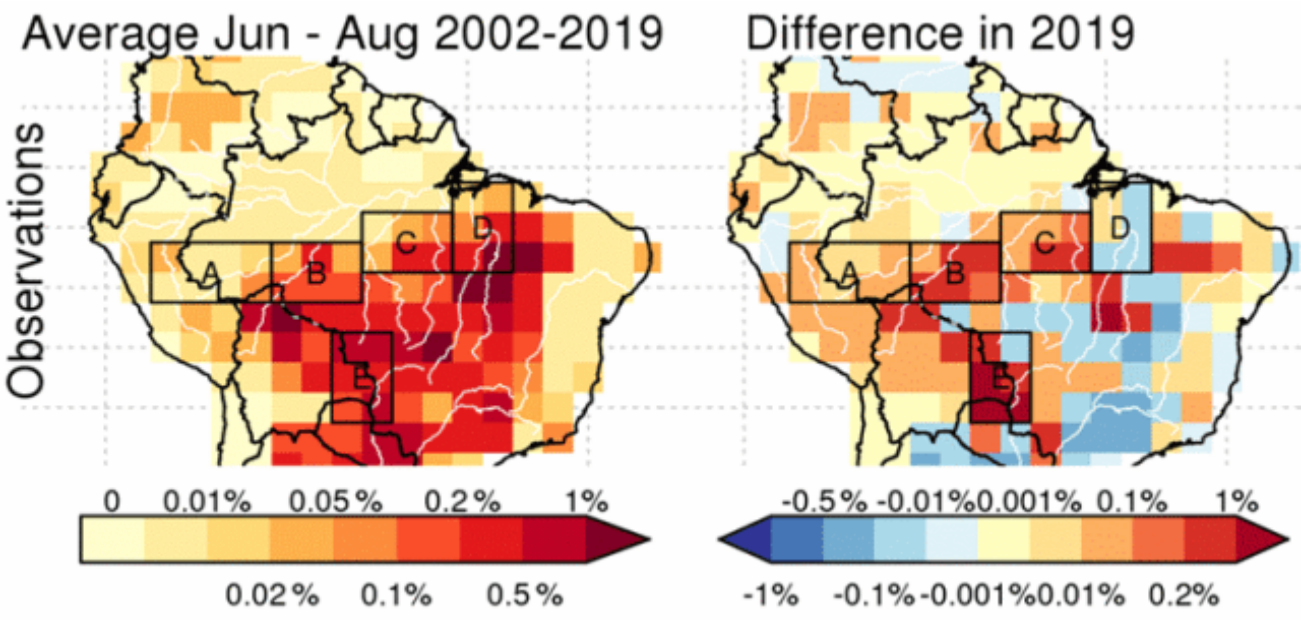


Figure 1. Maps of observed percentage of burnt area.
Left: Observed burnt area, for June–August 2002–2019 annual average.
Right: Difference between June–August 2019 and 2002–2019 average.

A key aspect of the research was comparing meteorological conditions for any given year with the extent of burned areas, following forest fires. A significant finding was that observations show that the burnt area was higher in 2019 than in previous years in regions where there had already been substantial deforestation.

Although fires can start from natural sources of ignition within the Amazon, previous studies have shown that fires in the region are rarely ignited without human intervention. The humid rainforest vegetation is not adapted to frequent burning and consequently there is higher tree mortality when fires do occur.

"Our conclusion is that human activity – landscape changes or fires started to clear forest – caused the increased level of burning and not the weather," says Dr Doug Kelley of UKCEH, who led the research.

Dr Kelley added living trees hold water, and this can suppress the spread of wild fires, even in drought periods. However, in deforested areas, felled wood and vegetation may be drier, acting as fuel for a fire.

The pied tamarin is one of the world's most threatened primates. Confined to a small part of the Brazilian Amazon rainforest, the Critically Endangered monkey is affected by several factors, largely linked to deforestation. Picture: Shutterstock

The Amazon is crucial to regulating the world's climate as it absorbs large amounts of carbon dioxide (CO_2) from the atmosphere. However, being a significant store of carbon, this may be re-released as CO_2 during deforestation and burning.

The scientists say deforestation creates a series of vicious cycles. It reduces the Amazon's ability to store carbon and absorb CO_2 while also increasing the risk of wildfires, which emit greenhouse gases and damage plant life that would otherwise retain carbon and remove CO_2 from the atmosphere. While the Amazon ecosystem 'takes care of itself' by recycling its own water, deforestation will reduce its ability to do this, and make the rainforest less stable.

Met Office climate scientist Dr Chantelle Burton, a co-author of the study, says: "It is important to be able to understand what is driving changes in fire trends, especially in globally important carbon sinks such as the Amazon. This could help inform decision making around land management practices to minimise unintended impacts – both on short timescales and for future responses to climate change."

The study – *Low meteorological influence found in 2019 Amazonia fires* -was funded by the Natural Environment Research Council. It has been published in the journal Biogeosciences.

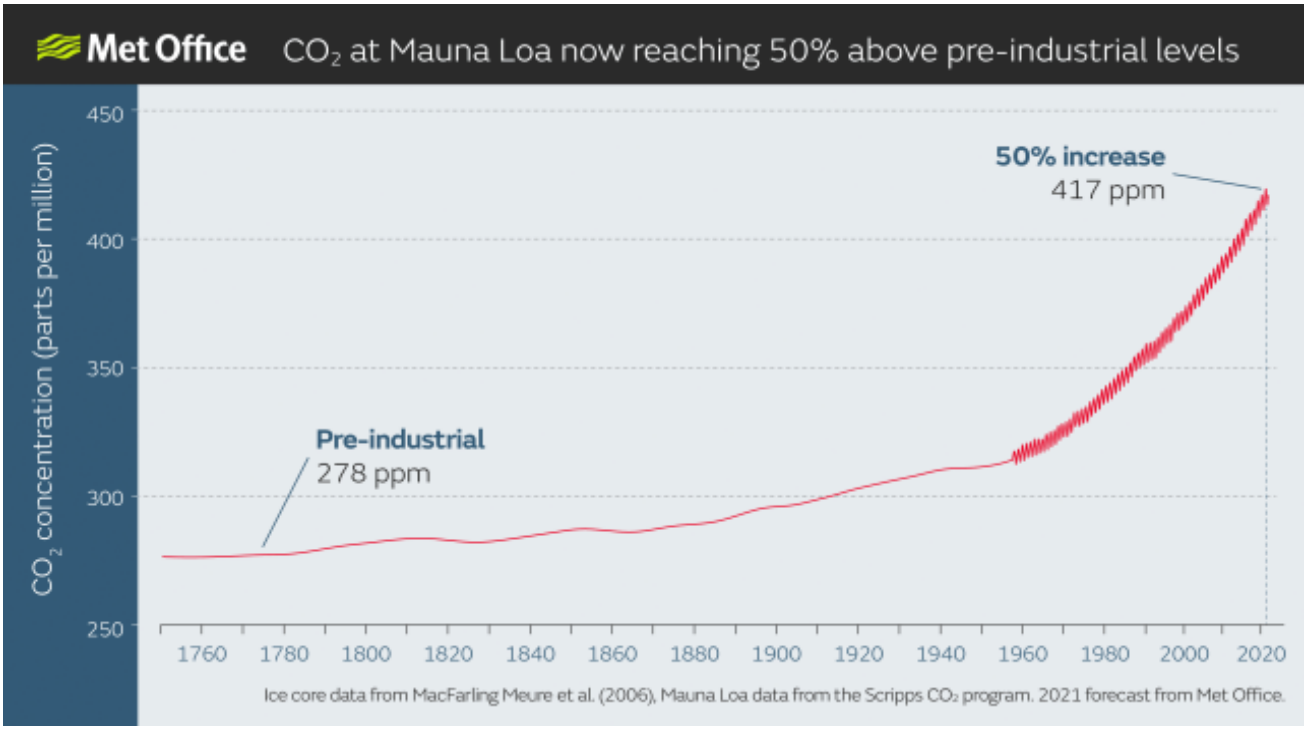
Date Created
March 2021

Atmospheric carbon dioxide passing ‘gloomy’ milestone

Description

This year the climate is passing a gloomy threshold. The concentration of carbon-dioxide in the atmosphere is reaching 417 parts per million: an increase of 50 per cent since humans embarked on the industrial revolution and began to emit greenhouse gasses at large scales.

Measurements at the Mauna Loa observatory in Hawaii are revealing that CO? concentrations have already been above this level on some days, and are expected to remain above this symbolic threshold for around three months.



Atmospheric rise in carbon dioxide from the industrial revolution to the present day

Next year, CO? concentrations are expected be more than 50% above pre-industrial across most of the year, and will continue to rise until global emissions reach net zero.

Prof Richard Betts MBE is Head of Climate Impacts Research at the Met Office, and one of his areas of research is forecasting the rise in atmospheric carbon dioxide. Prof Betts said: “Humans began burning fossil fuels at large scales at the end of the Eighteenth Century, and it took about 200 years for the atmosphere to see a 25 per cent increase in the atmospheric concentration of carbon dioxide, but only another 35 years to reach this year’s sorry milestone of a 50 per cent increase.”

You can read more about CO? passing this symbolic threshold in Prof Betts’s article in Carbon Brief.

Date Created
March 2021

What kind of temperature swings are ‘normal’ in UK spring?

Description

Spring snow fall can present challenges for livestock and livestock farmers. Picture: Shutterstock.

With forecasters predicting a marked shift in temperatures in the coming days, here we take a look at how commonplace temperature fluctuations are during a typical UK spring.

It’s certainly not uncommon for spring in the UK to see big differences in temperature. However, despite the lows expected in the coming days, the more climatologically notable weather for this time of year was actually the recent warm spell, which saw temperatures reach as high as 24.5°C in some places this week.

For reference, the highest daily temperature on record for March was 25.6°C in Mepal, Cambridgeshire, which was reported in March 1968. In contrast, the lowest daily temperature reported for March in the UK was –22.8°C at Logie, Aberdeenshire, in March 1958.

Dr Mark McCarthy, Scientific Manager of the National Climate Information Centre, said: “It’s not unusual to experience a wide temperature variation during a typical spring.”

On average the UK sees around 14 days each spring where temperatures fall to 0.0° C or below, and

even residents in central and southeastern England can expect to see temperatures drop to this level around 10 days each spring. Coastal regions and islands around the southern UK witness the fewest spring frosts on average.

Dr McCarthy added: “Of course, you would expect the lowest and highest spring temperatures to occur at the beginning and end of the season respectively, but natural variation dictates that periods of lower than average temperatures are to be expected as we move through the season.”

The coldest spring in recent years was 2013, which was the ninth coldest spring in a series from 1884. The average temperature didn’t reach 6.0° C. During the season over 80 weather stations recorded daily maximum temperatures below 0.0° C and even the station at East Okement in Okehampton Devon recorded a daytime maximum temperature of –2.0° C on 11 March 2013.

Such variation in temperature during spring does present challenges to some areas of UK life, with sheep farmers particularly susceptible to temperature drops as lambing season comes in to full view. Farmers have to monitor the changing weather to ensure their ewes and new-born lambs are guarded against drops in temperature, but also ensure they can be outside if the weather allows for it.

Chief Executive of the National Sheep Association Phil Stocker said: “The sector has endured several cold weather events during recent springs and these have wrought considerable hardship to both stock and hill farmers. However, being aware of the approaching change in weather type will allow farmers to buffer the impacts by taking action to avoid the worst losses.”

The up-and-down nature of spring’s temperatures also provides challenges for the UK’s gardeners, with overnight frosts the most feared weather and provide particular issues for magnolia and camellia flowers, as well as many fruit blossom and young fruitlets. If these plants are flowering for gardeners, spring remains a time when they have to be ready to ward off potential damage with coverings to stave off frost.

However, Chief Horticulturalist at the RHS Guy Barter said, “Cold weather in April is not altogether bad, spring flowers, ornamental cherries and daffodils, for example, last longer when it is chilly.”

Date Created
March 2021